```
FILE 'HOME' ENTERED AT 19:36:40 ON 09 MAR 2006

=> file reg
=> s tributyrin/cn
L1            1 TRIBUTYRIN/CN

=> d

L1   ANSWER 1 OF 1  REGISTRY  COPYRIGHT 2006 ACS on STN
RN   60-01-5  REGISTRY
ED   Entered STN:  16 Nov 1984
CN   Butanoic acid, 1,2,3-propanetriyl ester (9CI)  (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN   Butyrin, tri- (6CI, 8CI)
OTHER NAMES:
CN   Butyrin
CN   Butyryl triglyceride
CN   Glycerin tributyrate
CN   Glycerol tributanoate
CN   Glycerol tributyrate
CN   Glyceroltributyrin
CN   Glyceryl tributanoate
CN   Glyceryl tributyrate
CN   NSC 661583
CN   Tri-n-butyrin
CN   Tributanoin
CN   Tributin
CN   Tributyrin
CN   Tributyroin
CN   Tributyryl glyceride
CN   Tributyrylglycerol
FS   3D CONCORD
MF   C15 H26 O6
CI   COM
LC   STN Files:   AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, BIOTECHNO, CA, CABA,
       CAOLD, CAPLUS, CASREACT, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHEM,
       DDFU, DETHERM*, DIOGENES, DRUGU, EMBASE, HSDB*, IFICDB, IFIPAT, IFIUDB,
       IPA, MEDLINE, MRCK*, NAPRALERT, NIOSHTIC, PHAR, PIRA, PROMT, RTECS*,
       SPECINFO, TOXCENTER, USPAT2, USPATFULL, VTB
         (*File contains numerically searchable property data)
     Other Sources:   DSL**, EINECS**, TSCA**
         (**Enter CHEMLIST File for up-to-date regulatory information)
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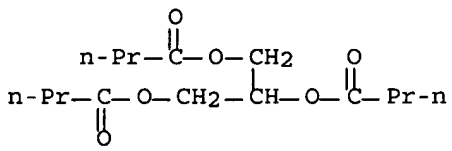

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**PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT**

           1127 REFERENCES IN FILE CA (1907 TO DATE)
              8 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
           1131 REFERENCES IN FILE CAPLUS (1907 TO DATE)
             49 REFERENCES IN FILE CAOLD (PRIOR TO 1967)


=> s triolein/cn
L2            1 TRIOLEIN/CN

=> d
```
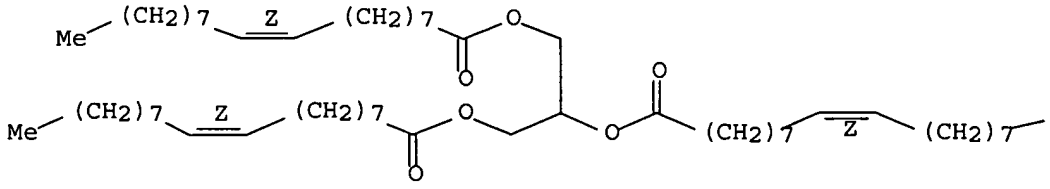

L2 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2006 ACS on STN
RN 122-32-7 REGISTRY
ED Entered STN: 16 Nov 1984
CN 9-Octadecenoic acid (9Z)-, 1,2,3-propanetriyl ester (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN 9-Octadecenoic acid (Z)-, 1,2,3-propanetriyl ester
CN Olein, tri- (8CI)
OTHER NAMES:
CN Actor LO 1
CN Aldo TO
CN Edenor NHTi-G
CN Emerest 2423
CN Emery 2423
CN Emery oleic acid ester 2230
CN Estol 1433
CN Glycerin trioleate
CN Glycerol trioleate
CN Glycerol triolein
CN Glyceryl trioleate
CN Glyceryl-1,2,3-trioleate
CN Kaolube 190
CN Kemester 1000
CN Oleic acid triglyceride
CN Oleic triglyceride
CN Oleyl triglyceride
CN Radia 7363
CN Raoline
CN sn-Glyceryl trioleate
CN Triglyceride OOO
CN Triolein
CN Trioleoylglyceride
CN Trioleoylglycerol
FS STEREOSEARCH
DR 124330-00-3, 24016-60-2, 41755-78-6
MF C57 H104 O6
CI COM
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, BIOTECHNO, CA, CABA, CAOLD, CAPLUS, CASREACT, CBNB, CHEMCATS, CHEMLIST, CIN, CSCHEM, DDFU, DETHERM*, DIPPR*, DRUGU, EMBASE, HSDB*, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, NAPRALERT, NIOSHTIC, PIRA, PROMT, RTECS*, SPECINFO, TOXCENTER, TULSA, USPAT2, USPATFULL
(*File contains numerically searchable property data)
Other Sources: DSL**, EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)

Double bond geometry as shown.

PAGE 1-A



PAGE 1-B

Me

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**PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT**

            4101 REFERENCES IN FILE CA (1907 TO DATE)
              95 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
            4113 REFERENCES IN FILE CAPLUS (1907 TO DATE)
              15 REFERENCES IN FILE CAOLD (PRIOR TO 1967)


=> file .nash
=> s (lipase or phospholipase or liplytic enzyme) and dough and digalactosyl diglyceride and
phospholipid and triglyceride
L3            0 FILE MEDLINE
L4            0 FILE CAPLUS
L5            0 FILE SCISEARCH
L6            0 FILE LIFESCI
L7            0 FILE BIOSIS
L8            0 FILE EMBASE

TOTAL FOR ALL FILES
L9            0 (LIPASE OR PHOSPHOLIPASE OR LIPLYTIC ENZYME) AND DOUGH AND DIGAL
                ACTOSYL DIGLYCERIDE AND PHOSPHOLIPID AND TRIGLYCERIDE

=> s (lipase or phospholipase or liplytic enzyme) and dough and digalactosyl diglyceride
L10           0 FILE MEDLINE
L11           0 FILE CAPLUS
L12           0 FILE SCISEARCH
L13           0 FILE LIFESCI
L14           0 FILE BIOSIS
L15           0 FILE EMBASE

TOTAL FOR ALL FILES
L16           0 (LIPASE OR PHOSPHOLIPASE OR LIPLYTIC ENZYME) AND DOUGH AND DIGAL
                ACTOSYL DIGLYCERIDE

=> s (lipase or phospholipase or liplytic enzyme) and dough
L17           4 FILE MEDLINE
L18         200 FILE CAPLUS
L19          28 FILE SCISEARCH
L20           2 FILE LIFESCI
L21          48 FILE BIOSIS
L22           1 FILE EMBASE

TOTAL FOR ALL FILES
L23         283 (LIPASE OR PHOSPHOLIPASE OR LIPLYTIC ENZYME) AND DOUGH

=> s l23 and phospholipid and triglyceride
L24           0 FILE MEDLINE
L25           3 FILE CAPLUS
L26           0 FILE SCISEARCH
L27           0 FILE LIFESCI
L28           0 FILE BIOSIS
L29           0 FILE EMBASE

TOTAL FOR ALL FILES
L30           3 L23 AND PHOSPHOLIPID AND TRIGLYCERIDE

=> d ibib abs 1-3

L30  ANSWER 1 OF 3  CAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:         2006:76204  CAPLUS Full-text
DOCUMENT NUMBER:          144:145413
TITLE:                    Lipolytic enzymes using galactolipids as substrates
                          from bacteria and their use in the manufacture of
                          galactosyl glycerides for food use
INVENTOR(S):              Miasnikov, Andrei; Soe, Jorn Borch; Mikkelsen, Jorn
                          Dalgaard; Povelainen, Mira; Pitkanen, Virve
PATENT ASSIGNEE(S):       Danisco A/S, Den.
SOURCE:                   PCT Int. Appl., 135 pp.
```

CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2006008653	A2	20060126	WO 2005-IB2602	20050718

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: GB 2004-16035 A 20040716
US 2004-591185P P 20040726
GB 2005-13859 A 20050707

AB A new class of lipolytic enzymes using galactosyl lipids and galactosyl phospholipids as substrates obtained from Streptomyces, Corynebacterium, and Thermobifida are described for use in the manufacture of galactosyl glycerides, e.g. for use as food additives. Galactolipases from two strains of Streptomyces were effective in hydrolysis of polar lipids, galactolipids, and phospholipids, but did not use triglycerides as a substrate. They were also effective against galactolipids in flour. Cloning and expression of the genes for these enzymes is reported.

L30 ANSWER 2 OF 3 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:1021793 CAPLUS Full-text
DOCUMENT NUMBER: 143:321133
TITLE: Cloning and sequence of a phospholipase from Fusarium and applications in bakery products and other food products
INVENTOR(S): Brunstedt, Janne; Mikkelsen, Jorn Dalgaard; Pedersen, Henrik; Soe, Jorn Borch
PATENT ASSIGNEE(S): Danisco A/S, Den.
SOURCE: PCT Int. Appl., 172 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005087918	A2	20050922	WO 2005-IB875	20050310

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: GB 2004-5637 A 20040312
US 2004-559149P P 20040402

AB The present invention relates to novel fungal lipolytic enzymes and to polynucleotides encoding novel fungal lipolytic enzymes. The present invention also relates to a fungal lipolytic enzyme having a higher ratio of activity on polar lipids (phospholipids and/or glycolipids) as compared with triglycerides, in particular a higher ratio of activity on glycolipids as compared with triglycerides. The invention also relates to methods of producing fungal lipolytic enzymes, and uses thereof. The present invention further

relates to the preparation of an improved foodstuff, in particular to the preparation of improved bakery products. Specifically, the invention provides novel fungal lipolytic enzymes, which enzymes are capable of conferring improved characteristics to food products, including bakery products. More specifically, expression, purification, sequencing and baking trials of phospholipase from Fusarium heterosporum are described. The nucleotide sequences and the encoded amino acid sequences of the phospholipases from F. heterosporum and F. semitectum are provided. Construction and expression of a synthetic gene encoding a phospholipase from F. heterosporum (CBS 782.83) in Hansenula polymorpha is reported.

L30 ANSWER 3 OF 3 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2000:316817 CAPLUS Full-text
DOCUMENT NUMBER: 132:333701
TITLE: Food emulsifiers comprising complexes of enzymically degraded lecithins and gliadin or glutenin
INVENTOR(S): Yamashita, Masatsugu; Sugino, Miki
PATENT ASSIGNEE(S): Taiyo Kagaku Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000135427	A2	20000516	JP 1998-326068	19981029
PRIORITY APPLN. INFO.:			JP 1998-326068	19981029

AB The emulsifiers, which are easily dispersed in H2O and improve texture of food, comprise complex of enzymically degraded lecithins (including phospholipids other than phosphatidylcholines here) with gliadin or glutenin. The degraded lecithins may be prepared by degrading phospholipids by phospholipase A or phospholipase D. The degraded lecithins preferably show content of an acetone-soluble matter ≤10%. Soybean lecithins were treated with phospholipase A2, treated with acetone twice to remove triglycerides, free fatty acids, and fat-soluble components, and then dried to give lysolecithin powder. The lysolecithin powder was dissolved in H2O, treated with gliadin or glutenin under stirring for 7 min, and the solution was freeze-dried to give powder. Japanese wheat noodle manufactured from dough containing the powder had appropriate hardness, mouthfeel, and smoothness.

=> s (lipase or phospholipase or liplytic enzyme) and dough and galactosyl diglyceride and phospholipid and triglyceride
L31 0 FILE MEDLINE
L32 0 FILE CAPLUS
L33 0 FILE SCISEARCH
L34 0 FILE LIFESCI
L35 0 FILE BIOSIS
L36 0 FILE EMBASE

TOTAL FOR ALL FILES
L37 0 (LIPASE OR PHOSPHOLIPASE OR LIPLYTIC ENZYME) AND DOUGH AND GALAC TOSYL DIGLYCERIDE AND PHOSPHOLIPID AND TRIGLYCERIDE

=> file reg

=> s digalactosyl diglyceride/cn
L38 0 DIGALACTOSYL DIGLYCERIDE/CN

=> s digalactosyl glyceride/cn
L39 0 DIGALACTOSYL GLYCERIDE/CN

=> s galactosyl glyceride/cn
L40 0 GALACTOSYL GLYCERIDE/CN

=> file .nash
=> s digalactosyl diglyceride
L41 39 FILE MEDLINE
L42 346 FILE CAPLUS
L43 34 FILE SCISEARCH

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L44          18 FILE LIFESCI
L45         129 FILE BIOSIS
L46          23 FILE EMBASE

TOTAL FOR ALL FILES
L47         589 DIGALACTOSYL DIGLYCERIDE

=> s l47 and (lipase or phspholipase or lipolytic enzyme)
L48           3 FILE MEDLINE
L49          10 FILE CAPLUS
L50           2 FILE SCISEARCH
L51           0 FILE LIFESCI
L52           3 FILE BIOSIS
L53           1 FILE EMBASE

TOTAL FOR ALL FILES
L54          19 L47 AND (LIPASE OR PHSPHOLIPASE OR LIPOLYTIC ENZYME)

=> dup rem l54
PROCESSING COMPLETED FOR L54
L55          14 DUP REM L54 (5 DUPLICATES REMOVED)

=> d ibib abs 1-14

L55  ANSWER 1 OF 14  CAPLUS  COPYRIGHT 2006 ACS on STN DUPLICATE 1
ACCESSION NUMBER:         1996:474249  CAPLUS Full-text
DOCUMENT NUMBER:          125:166137
TITLE:                    Application of enzymic reactions for evaluation of
                          quality changes in frozen vegetables
AUTHOR(S):                Park, K. H.; Kim, J. W.; Kim, M. J.
CORPORATE SOURCE:         Dep. Food Sci. Technol. Res. Center New Bio-Materials
                          Agric., Seoul National Univ., Suwon, 441-744, S. Korea
SOURCE:                   ACS Symposium Series (1996), 631(Chemical Markers for
                          Processed and Stored Foods), 159-178
                          CODEN: ACSMC8; ISSN: 0097-6156
PUBLISHER:                American Chemical Society
DOCUMENT TYPE:            Journal
LANGUAGE:                 English
AB    Thermal inactivation of lipid-acyl-hydrolase (LAHase) which is capable of hydrolyzing
      phospholipid and galactolipid was investigated to optimize the blanching process prior to
      frozen storage of vegetables.  The results of in-situ anal., measuring decomposition of
      lecithin, mono- and digalactosyl diglyceride indicated that LAHase could be adequately
      used as the indicator enzyme for determination of quality deterioration of frozen
      vegetables.  A time-temperature indicator (TTI) using a phospholipid-phospholipase system
      was also developed to monitor quality change of frozen foods.  The TTI containing
      phospholipid, phospholipase, a mixture of pH indicators, and antifreeze reactants was
      designed for reactions at sub-zero temps.  The TTI was more reliable than the lipase
      system in monitoring quality changes of frozen food during storage.  The TTI had an
      activation energy of 32.1 kcal/mol, suitable for many food reactions.


L55  ANSWER 2 OF 14     MEDLINE on STN                DUPLICATE 2
ACCESSION NUMBER:   96014420     MEDLINE Full-text
DOCUMENT NUMBER:    PubMed ID: 8520121
TITLE:              Purification and characterization of a new lipase
                    from Fusarium sp. YM-30.
AUTHOR:             Mase T; Matsumiya Y; Akiba T
CORPORATE SOURCE:   Research and Development Division, Amano Pharmaceutical
                    Co., Ltd., Aichi, Japan.
SOURCE:             Bioscience, biotechnology, and biochemistry, (1995 Sep)
                    Vol. 59, No. 9, pp. 1771-2.
                    Journal code: 9205717. ISSN: 0916-8451.
PUB. COUNTRY:       Japan
DOCUMENT TYPE:      Journal; Article; (JOURNAL ARTICLE)
LANGUAGE:           English
FILE SEGMENT:       Biotechnology
ENTRY MONTH:        199601
ENTRY DATE:         Entered STN: 19960219
                    Last Updated on STN: 19960219
                    Entered Medline: 19960119
```

AB The extracellular lipase from Fusarium sp. YM-30 was purified by a procedure involving ultrafiltration, ammonium sulfate precipitation, and DEAE-Toyopearl 650M, CM-Toyopearl 650M, and Butyl-Toyopearl 650M column chromatographies. The purified lipase was homogeneous with 12kDa of molecular mass by SDS-PAGE, and had high specificities for mono- and diacylglycerols, but low toward triacylglycerols. The enzyme had maximum activity at pH 7.0 to 8.0 and 37 degrees C, and hydrolyzed digalactosyl diglyceride too.

L55 ANSWER 3 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1995:919028 CAPLUS Full-text
TITLE: Application of enzymetic reactions for evaluation of quality changes in frozen foods.
AUTHOR(S): Park, K. H.
CORPORATE SOURCE: Research Center New Bio-Materials Agriculture, Seoul National University, Suwon, 441-744, S. Korea
SOURCE: Book of Abstracts, 210th ACS National Meeting, Chicago, IL, August 20-24 (1995), Issue Pt. 1, AGFD-032. American Chemical Society: Washington, D. C.
CODEN: 61XGAC
DOCUMENT TYPE: Conference; Meeting Abstract
LANGUAGE: English
AB To optimize blanching process prior to frozen storage thermal inactivation of lipid-acyl-hydrolase (LAHase) which is capable of hydrolyzing phospholipid and galactolipid was determined The results of in-situ anal., measuring the decomposition of lecithin, mono- and digalactosyl diglyceride indicated that LAHase could be adequately used as the indicator enzyme for determination of quality preservation of frozen vegetables. A time-temperature indicator(TTI) using phospholipid-phospholipase was also developed to monitor quality change of frozen foods. The TTI containing phospholipid, phospholipase, mixture of pH indicator, and antifreeze reactants was designed for reactions at sub-zero temperature The TTI was more reliable than the lipase system in monitoring quality changes of frozen pork during storage. The TTI had an activation energy 32.1 kcal/mol, suitable for many food reactions.

L55 ANSWER 4 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1984:420705 CAPLUS Full-text
DOCUMENT NUMBER: 101:20705
TITLE: Serological investigations of the function of galactolipids in the thylakoid membrane
AUTHOR(S): Radunz, A.; Bader, K. P.; Schmid, G. H.
CORPORATE SOURCE: Fak. Biol., Univ. Bielefeld, Bielefeld, D-4800/1, Fed. Rep. Ger.
SOURCE: Zeitschrift fuer Pflanzenphysiologie (1984), 114(3), 227-31
CODEN: ZSPPAD; ISSN: 0044-328X
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The influence of monospecific antisera to monogalactosyl diglyceride and to digalactosyl diglyceride on the photosynthetic electron transport in chloroplasts of higher plants was examined Both antisera inhibited the photoredn. of dichlorophenolindophenol (DCPIP) with water as the native electron donor, as well as the reduction of anthraquinone-2-sulfonate with the electron donor couple DCPIP/ascorbate. The degree of inhibition of the galactolipid antisera in the region of photosystem (PS) I depends on the pH and the temperature of the reaction assay. Treatment of the chloroplasts with Na periodate or with lipase results in a complete loss of any inhibition by the galactolipid antisera. Treatment with β-galactosidase, however, had no influence on the reactions with galactolipid antisera. The sites of inhibition of the galactolipid antisera could be localized on the donor side of PS I as well as on the donor side of PS II. Thus, the mono- and digalactosyl diglyceride mols. that are localized on the stroma side of the membrane are components of the PS I- and also of the PS II-protein-lipid-complex, and there are obviously interactions between the galactolipid mols. and the photosynthetically active proteins, since the binding of antibodies leads to a partial blocking of electron transport.

L55 ANSWER 5 OF 14 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation on STN
ACCESSION NUMBER: 1979:202719 BIOSIS Full-text
DOCUMENT NUMBER: PREV197968005223; BA68:5223
TITLE: GALACTO LIPIDS AND GALACTO LIPASES OF MUNG BEAN LEAVES.

AUTHOR(S): BHATIA I S [Reprint author]; DHIR A; SUKHIJA P S
CORPORATE SOURCE: DEP BIOCHEM, PUNJAB AGRIC UNIV, LUDHIANA-141004, PUNJAB, INDIA
SOURCE: Plant Biochemical Journal, (1978) Vol. 5, No. 1, pp. 37-43.
CODEN: PBJODQ. ISSN: 0379-5578.
DOCUMENT TYPE: Article
FILE SEGMENT: BA
LANGUAGE: ENGLISH

AB Total lipids of mung bean (Phaseolus aureus) were separated into individual polar and non-polar lipid components and were identified by their staining behavior with various specific reagents and by their relative Rf values. Apart from pigments and glycerides, phosphatidyl inositol, sulfolipids, phosphatidic acid, digalactosyl diglyceride (I), phosphatidyl ethanolamine, phosphatidyl choline, monogalactosyl diglyceride (II) diphosphatidyl glycerol and sterol glycoside, were identified as polar lipid components. I and II were isolated and purified by column chromatography in combination with acetone precipitation from mung bean leaves. Linolenic acid was the major fatty acid component (74%) in I. Leaf tissues of mung bean contained galactolipases which catalyzed the hydrolysis of I and II. The enzyme was isolated and partially purified by dialysis and ammonium sulfate precipitation followed by dialysis. The crude fraction of the enzyme seemed to have α- and β-galactosidase activity in addition to its normal galactolipase activity.

L55 ANSWER 6 OF 14 MEDLINE on STN
ACCESSION NUMBER: 77261215 MEDLINE Full-text
DOCUMENT NUMBER: PubMed ID: 19886
TITLE: [Thermal inactivation and storage behavior of technologically important enzymes. IV. Spinach lipid-acyl-hydrolase].
Thermische Inaktivierung und Lagerungsverhalten techologisch wichtiger Enzyme. IV. Lipid-Acyl-Hydrolase in Spinat.
AUTHOR: Park K H; Duden R; Fricker A
SOURCE: Zeitschrift fur Ernahrungswissenschaft, (1977 Jun) Vol. 16, No. 2, pp. 107-14.
Journal code: 0413632. ISSN: 0044-264X.
PUB. COUNTRY: GERMANY, WEST: Germany, Federal Republic of
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: German
FILE SEGMENT: Priority Journals
ENTRY MONTH: 197710
ENTRY DATE: Entered STN: 19900314
Last Updated on STN: 19970203
Entered Medline: 19771028

AB The thermal reaction of a lipid-acyl-hydrolase which seems to be important for the quality preservation of vegetable foods, was investigated in spinach. The authors applied a simple in-situ method using thin-layer chromatography which had been developed for the enzyme determination, to follow the thermal inactivation of the lipid-acyl-hydrolase by measuring the decomposition of lecithin, mono- und digalactosyl diglycerides. According to the inactivation curves, the enzyme is relatively little resistant to heat. Since the D- and z-values resulting from the inactivation curves for phospholipase, mono- and digalacto- lipase activities are almost the same, it can be assumed that the lipid-acyl-hydrolase is a multi-function enzyme in spinach.

L55 ANSWER 7 OF 14 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation on STN
ACCESSION NUMBER: 1976:204058 BIOSIS Full-text
DOCUMENT NUMBER: PREV197662034058; BA62:34058
TITLE: ROLE OF GALACTO LIPIDS IN SPINACH CHLOROPLAST LAMELLAR MEMBRANES PART 2 EFFECTS OF GALACTO LIPID DEPLETION ON PHOSPHORYLATION AND ELECTRON FLOW.
AUTHOR(S): SHAW A B; ANDERSON M M; MCCARTY R E
SOURCE: Plant Physiology (Rockville), (1976) Vol. 57, No. 5, pp. 724-729.
CODEN: PLPHAY. ISSN: 0032-0889.
DOCUMENT TYPE: Article
FILE SEGMENT: BA
LANGUAGE: Unavailable

AB A galactolipid lipase from primary bean (Phaseolus vulgaris) leaves was used to partially deplete spinach chloroplast inner membranes of their galactolipids. Chloroplasts treated with the lipase in the absence of bovine serum albumin lost 91% of their monogalactosyl

diglyceride, 83% of their digalactosyl diglyceride, all of their phosphatidyl choline, but none of their sulfolipid. EM of thin sections revealed that the treated chloroplasts were greatly enlarged and lacked membrane stacking. Linolenic acid had similar effects on the structure of the chloroplasts. Chlorophyll, carotenoids and coupling factor 1 remained bound to the treated membranes. To minimize the inhibition of phosphorylation and electron flow by fatty acids released by the lipase, bovine serum albumin (15-24 mg/ml) was added to the lipase incubation mixtures. Bovine serum albumin inhibited the extent, but not the initial rate, of fatty acid release by the lipase. EM of chloroplasts treated with the lipase in the presence of bovine serum albumin showed that membrane stacking was partially maintained. Chloroplasts treated with lipase under these conditions retained about 30% of their monogalactosyl diglyceride, 50% of their digalactosyl diglyceride and phosphatidyl choline. The sulfolipid and phosphatidyl glycerol contents were unchanged. Electron flow through photosystems I and II with artificial electron donors and acceptors was not affected by lipase treatment in the presence of bovine serum albumin. In contrast, O2 evolution and phosphorylation were partially inhibited. These reactions were also very sensitive to fatty acids and it was possible that the inhibition was the result of interaction of fatty acids with the membrane prior to their binding to bovine serum albumin. In view of the irreversible inactivation of electron flow and phosphorylation by fatty acids, it was difficult to assess the role of galactolipids in these processes when a specific lipase was used to deplete the membrane.

L55 ANSWER 8 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1976:28064 CAPLUS Full-text
DOCUMENT NUMBER: 84:28064
TITLE: Lipid composition and the role of the haustorium in the young seedling of the West African oil palm, Elaeis guineensis
AUTHOR(S): Opute, F. I.
CORPORATE SOURCE: Unilever Res., Sharnbrook, UK
SOURCE: Annals of Botany (Oxford, United Kingdom) (1975), 39(164), 1057-61
CODEN: ANBOA4; ISSN: 0305-7364
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The lipid and fatty acid composition of the haustorium of the developing seedling of the West African oil palm, E. guineensis, has been studied using the combined techniques of thin-layer and gas-liquid chromatog. In addition to triglycerides, which represented over 75% of the total lipids, there were present small quantities of free fatty acids, diglycerides, and polar lipids. The 2 glycolipids, monogalactosyl and digalactosyl diglycerides, formed the bulk of the polar lipids, with small amts. of phosphatidylcholine and phosphatidylinositol. In general, the fatty acid pattern of the haustorium was intermediate between that of the palm kernel oil and the palm fruit mesocarp, and resembled to a great extent the fatty acids of the kernel testa. It is suggested, from the presence of the biol. membrane lipids and lipolytic enzymes, that the main function of the haustorium is that of food moiblization and transport for the young plant.

L55 ANSWER 9 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1975:166884 CAPLUS Full-text
DOCUMENT NUMBER: 82:166884
TITLE: Gas-liquid chromatography of plant galactolipids and their deacylation and methanolysis products
AUTHOR(S): Williams, J. P.; Watson, G. R.; Khan, M.; Leung, S.; Kuksis, A.; Stachnyk, O.; Myher, J. J.
CORPORATE SOURCE: Dep. Bot., Univ. Toronto, Toronto, ON, Can.
SOURCE: Analytical Biochemistry (1975), 66(1), 110-22
CODEN: ANBCA2; ISSN: 0003-2697
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The gas chromatog. anal. of monogalactosyl diglyceride (MGDG) and digalactosyl diglyceride (DGDG) and their deacylation and methanolysis products was reported. MGDG and DGDG and their galactosyl monoglycerides were chromatographed as their trimethylsilyl derivs. Galactosyl monoglycerides were produced by partial deacylation of the diglycerides with Grignard's reagent and pancreatic lipase. The products of complete deacylation, mono- and digalactosyl glycerols, were separated as O-Me, O-Ac, O-trimethylsilyl and O-trifluoroacetyl derivs. Gas chromatog. of derivs. of the methanolysis products of MGDG and DGDG and the methylated galactosyl glycerols allowed the separation and quant. recovery of the galactose and glycerol of both lipids and the 2 galactoses of DGDG.

L55 ANSWER 10 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN DUPLICATE 3
ACCESSION NUMBER: 1974:56936 CAPLUS Full-text
DOCUMENT NUMBER: 80:56936
TITLE: Suitability of lipase from Rhizopus arrhizus delemar for analysis of fatty acid distribution in dihexosyl diglycerides, phospholipids, and plant sulfolipids
AUTHOR(S): Fischer, Werner; Heinz, Ernst; Zeus, Manfred
CORPORATE SOURCE: Physiol.-Chem. Inst., Univ. Erlangen, Erlangen, Fed. Rep. Ger.
SOURCE: Hoppe-Seyler's Zeitschrift fuer Physiologische Chemie (1973), 354(9), 1115-23
CODEN: HSZPAZ; ISSN: 0018-4888
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Lipase (EC 3.1.1.3) (I) from R. arrhizus delemar specifically cleaved glycerides at position 1 of glycerol. In addition to hydrolysis of semisynthetic galactolipids and naturally occurring phospholipids, I reacted with sulfolipids and digalactosyl diglycerides from plants and with di- and triglucosyl diglycerides and phosphoglucolipids of bacteria. I is suitable for analyzing the fatty acid distribution in all glycerolipids. Digalactosyl diglycerides and sulfolipids could also be hydrolyzed with pancreatic I which, however, reacted much more slowly because of the low activity present in partly purified prepns. Neither I could be used for the location of fatty acid esters in glycolipids because they rapidly split off acyl groups linked to the C-6 positions of hexoses.

L55 ANSWER 11 OF 14 MEDLINE on STN
ACCESSION NUMBER: 70230290 MEDLINE Full-text
DOCUMENT NUMBER: PubMed ID: 5427281
TITLE: The metabolism of glyceride glycolipids. IV. Enzymatic hydrolysis of monogalactosyl and digalactosyl diglycerides in rat brain.
AUTHOR: Subba Rao K; Wenger D A; Pieringer R A
SOURCE: The Journal of biological chemistry, (1970 May 25) Vol. 245, No. 10, pp. 2520-4.
Journal code: 2985121R. ISSN: 0021-9258.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 197008
ENTRY DATE: Entered STN: 19900101
Last Updated on STN: 19900101
Entered Medline: 19700826

L55 ANSWER 12 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1970:505704 CAPLUS Full-text
DOCUMENT NUMBER: 73:105704
TITLE: Monogalactosyl and digalactosyl diglyceride acyl hydrolase
AUTHOR(S): Sastry, Pidaparty S.; Kates, Morris
CORPORATE SOURCE: Clarke Inst., Univ. Toronto, Toronto, ON, Can.
SOURCE: Methods in Enzymology (1969), 14, 204-8
CODEN: MENZAU; ISSN: 0076-6879
DOCUMENT TYPE: Journal
LANGUAGE: English
AB For its assay monogalactosyl- or digalactosyldilinolenin is incubated with the enzyme, and the acyl ester groups remaining in the CHCl3-soluble products are determined colorimetrically; alternatively, the linolenic acid released is determined by gas-liquid chromatog. For its preparation and purification fresh leaves of runner bean are blended with distilled water, centrifuged to remove chloroplasts and unbroken cells, and centrifuged again to remove microsomal particles and chloroplast fragments. The supernatant is dialyzed against phosphate buffer, to the dialyzate is added (NH4)2SO4 to 35% saturation, and the precipitate is removed and discarded. To the supernatant is added (NH4)2SO4 to 70-5% saturation, the precipitate is centrifuged, dissolved in phosphate buffer, dialyzed against the same buffer, and diluted The enzyme activity toward the digalactosyl diglyceride is much less stable than that toward the monogalactosyl diglyceride. It is highly specific for unsatd. mono- and digalactosyl diglycerides , their saturated counterparts being completely resistant to hydrolysis, it is active toward the monogalactosyl substrate over the pH range 6.5-7.5 and toward the digalactosyl

substrate over the range 4.5-7.0. Values for the Michaelis consts. are 7.8mM for monogalactosyldilinolenin and 1.5mM for digalactosyldilinolenin. Galactolipid-hydrolyzing activity appears to be confined to leaves of the Phaseolus family.

L55 ANSWER 13 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1967:91761 CAPLUS Full-text
DOCUMENT NUMBER: 66:91761
TITLE: Positional distribution of fatty acids in galactolipids of Artemisia princeps leaves
AUTHOR(S): Noda, Manjiro; Fujiwara, Nobukazu
CORPORATE SOURCE: Univ. Kyoto, Kyoto, Japan
SOURCE: Biochimica et Biophysica Acta, Lipids and Lipid Metabolism (1967), 137(1), 199-201
CODEN: BBLLA6; ISSN: 0005-2760
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Purified monogalactosyl and digalactosyl diglycerides from lipid exts. of A. princeps leaves were individually subjected to the action of pancreatic lipase, and the hydrolysis products were separated by chromatog. on a silica gel G plate and characterized. The compds. obtained from the monogalactosyl and digalactosyl glycerides were monogalactosyl monoglyceride and digalactosyl monoglyceride, resp. Most of the saturated and monoenoic acids were found in the liberated acids, in contrast to the higher concns. of linolenic acid in the mono- and digalactosyl monoglycerides. The monoglycerides were subjected to hydrolysis with 2% H_2SO_4, 2 hrs. at 100°, or, less effectively, with β-galactosidase, 24 hrs. at 37°. The ratios of 1- to 2-monoglyceride were 1.9:98.1 in the acid hydrolysis products of monogalactosyl monoglyceride, and 3.8:96.2 in those of digalactosyl monoglycerol. Enzymic hydrolysis gave similar results. The monoglycerides obtained after treatment with 56% $HClO_4$ were in an equilibrium mixture in which the 1-monoglyceride predominated. The acid or enzyme conversion thus did not result in substantial acyl migration. Most of the partial hydrolysis products of mono- and digalactosyl diglycerides consisted of 1-mono- and digalactosyl-2-acyl-D- glycerol, resp., and, in the case of mono- and digalactosyl diglycerides containing different fatty acids, saturated and monoenoic acids were esterified mainly at the 3-position of glycerol and linolenic acid at the 2-position.

L55 ANSWER 14 OF 14 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1964:462757 CAPLUS Full-text
DOCUMENT NUMBER: 61:62757
ORIGINAL REFERENCE NO.: 61:10935f-h
TITLE: Hydrolysis of monogalactosyl and digalactosyl diglycerides by specific enzymes in runner-bean leaves
AUTHOR(S): Sastry, P. S.; Kates, M.
CORPORATE SOURCE: Natl. Res. Council, Ottawa, ON, Can.
SOURCE: Biochemistry (1964), 3(9), 1280-7
CODEN: BICHAW; ISSN: 0006-2960
DOCUMENT TYPE: Journal
LANGUAGE: Unavailable

AB Runner-bean leaves contain specific enzymes, associated both with the chloroplast and cell-sap cytoplasm fractions, which catalyze the hydrolysis of monogalactosyldilinolenin and digalactosyldilinolenin to the corresponding galactosylglycerols and free linolenic acid. No evidence for the formation of lyso compds. was obtained, but these are presumed to be intermediates. The cell-sap cytoplasm also contains α- and β-galactosidases which catalyze hydrolysis of the galactosylglycerols to free galactose and glycerol. The galactolipid-hydrolyzing enzymes in the cell-sap cytoplasm, after 3-fold purification by $(NH_4)_2SO_4$ fractionation, had the following properties: optimum pH 7.0 for monogalactosyldilinolenin, 5.6 for digalactosyldilinolenin; apparent Michaelis-Menten constant 7.8 + 10-3M for monogalactosyldilinolenin, 1.5 + 10-3M for digalactosyldilinolenin. This enzyme preparation was active only toward unsatd. galactolipids, and was free from lipase and phospholipase activities. Ca ion had no effect, and solvents such as Et_2O were inhibitory rather than stimulating. Galactolipid-hydrolyzing activity has so far been demonstrated only in leaves of Phaseolus species and in com. pancreatin.

=> log y

WEST Search History

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DATE: Thursday, March 09, 2006

Hide?	Set Name	Query	Hit Count
		DB=PGPB; THES=ASSIGNEE; PLUR=YES; OP=ADJ	
☐	L5	L4 and digalactosyl diglyceride and phospholipid and triglyceride	9
☐	L4	dough and (lipase or phosphlipase or lipolytic enzyme)	240
		DB=USPT,USOC,EPAB,JPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=ADJ	
☐	L3	L1 and digalactosyl diglyceride and phospholipid and triglyceride	6
☐	L2	L1 and digalactosyl diglyceride same phospholipid same triglyceride	2
☐	L1	dough and (lipase or phosphlipase or lipolytic enzyme)	426

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Search Results - Record(s) 1 through 6 of 6 returned.

☐ 1. Document ID: US 6967035 B2

Using default format because multiple data bases are involved.

L3: Entry 1 of 6 File: USPT Nov 22, 2005

US-PAT-NO: 6967035
DOCUMENT-IDENTIFIER: US 6967035 B2

TITLE: Method of improving dough and bread quality

DATE-ISSUED: November 22, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bojsen; Kirsten	2900 Hellerup			DK
Poulsen; Charlotte Horsmans	8220 Braband			DK
Soe; Jorn Borch	8381 Tilst			DK

US-CL-CURRENT: 426/20; 426/18, 426/549, 426/653

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 2. Document ID: US 6852346 B2

L3: Entry 2 of 6 File: USPT Feb 8, 2005

US-PAT-NO: 6852346
DOCUMENT-IDENTIFIER: US 6852346 B2

TITLE: Method for preparing flour doughs and products made from such doughs using lipase

DATE-ISSUED: February 8, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
S.o slashed.e; Jorn Borch	Mundelstrup			DK
Poulsen; Charlotte Horsmans	Bradbrand			DK
Rasmussen; Preben	Kirke Hyllinge			DK
Madrid; Susan Mampusti	V.ae butted.rl.o slashed.se			DK
Zargahi; Masoud R.	.ANG.rhus C.			DK

US-CL-CURRENT: 426/18; 426/20, 426/52, 426/549, 426/653

ABSTRACT:

Method of improving the rheological properties of a flour dough and the quality of bread, alimentary paste products, noodles and cakes wherein glycerol oxidase or a combination of glycerol oxidase and a lipase is added to the dough and dough improving compositions comprising these enzymes. The strength of (B/C ratio) and the gluten index of the dough was improved and in the resulting products the improvements were higher specific volume, increased crumb pore homogeneity and reduced average crumb pore diameter.

20 Claims, 4 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

☐ 3. Document ID: US 6406723 B1

L3: Entry 3 of 6 File: USPT Jun 18, 2002

US-PAT-NO: 6406723
DOCUMENT-IDENTIFIER: US 6406723 B1

TITLE: Method for preparing flour doughs and products made from such doughs using glycerol oxidase and lipase

DATE-ISSUED: June 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
S.o slashed.e; J.o slashed.rn Borch	Mundelstrup			DK
Poulsen; Charlotte Horsmans	Bradbrand			DK
Rasmussen; Preben	Kirke Hyllinge			DK
Madrid; Susan Mampusti	Vaerl.o slashed.se			DK
Zargahi; Masoud R.	.ANG.rhus			DK

US-CL-CURRENT: 426/18; 426/554

ABSTRACT:

A method of improving the rheological properties of a flour dough and the quality of bread, alimentary paste products, noodles and cakes produced therefrom, wherein a combination of (a) a glycerol oxidase which does not require a co-factor to oxidize glycerol, and (b) a lipase, is added to the dough to produce a synergistic effect upon said rheological properties; and dough improving compositions containing such components.

31 Claims, 4 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

☐ 4. Document ID: US 20050196766 A1, WO 2005066347 A1

L3: Entry 4 of 6 File: DWPI Sep 8, 2005

DERWENT-ACC-NO: 2005-506874
DERWENT-WEEK: 200559

TITLE: Producing a variant glycolipid acyltransferase enzyme by selecting a parent enzyme, modifying one or more amino acids, selecting a variant enzyme with an enhanced transferase or hydrolytic activity towards galactolipids

INVENTOR: DE KREIJ, A; MIKKELSON, J D ; SOE, J B ; KELLET-SMITH, A H ; KREIJ, A D ; LORENTSEN, R H

PRIORITY-DATA: 2004US-0911160 (August 2, 2004), 2003GB-0030016 (December 24, 2003), 2004WO-IB00655 (January 15, 2004), 2004GB-0015999 (July 16, 2004)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
US 20050196766 A1	September 8, 2005		000	C12Q001/68
WO 2005066347 A1	July 21, 2005	E	195	C12N015/54

INT-CL (IPC): C12 N 9/10; C12 N 9/14; C12 N 11/00; C12 N 15/09; C12 N 15/54; C12 N 15/55; C12 P 7/64; C12 Q 1/68

ABSTRACTED-PUB-NO: WO2005066347A
BASIC-ABSTRACT:

NOVELTY - Producing a variant glycolipid acyltransferase enzyme comprises:

(1) selecting a parent enzyme;

(2) modifying one or more amino acids;

(3) testing the variant lipid acyltransferase for transferase activity, and optionally hydrolytic activity, on a substrate;

(4) selecting a variant enzyme with an enhanced activity towards galactolipids compared with the parent enzyme; and optionally

(5) preparing a quantity of the variant enzyme.

DETAILED DESCRIPTION - Producing a variant glycolipid acyltransferase enzyme comprises:

(1) selecting a parent enzyme which is a lipid acyltransferase enzyme;

(2) modifying one or more amino acids to produce a variant lipid acyltransferase;

(3) testing the variant lipid acyltransferase for transferase activity, and optionally hydrolytic activity, on a galactolipid substrate, and optionally a

phospholipid or triglyceride substrate;

(4) selecting a variant enzyme with an enhanced activity towards galactolipids compared with the parent enzyme; and optionally

(5) preparing a quantity of the variant enzyme.

The lipid acyltransferase enzyme comprises the amino acid sequence motif GDSX5.

INDEPENDENT CLAIMS are also included for:

(1) a variant glycolipid acyltransferase enzyme comprising the amino acid sequence motif GDSX5;

(2) a method of preparing a foodstuff;

(3) a method of preparing a baked product from a dough; and

(4) a process of enzymatic degumming of vegetable or edible oils.

USE - The variant glycolipid acyltransferase enzyme is used in a foodstuff for preparing a lyso-glycolipid, for example digalactosyl monoglyceride (DGMG) or monogalactosyl monoglyceride (MGMG) by treatment of a glycolipid (e.g. digalactosyl diglyceride (DGDG) or monogalactosyl diglyceride (MGDG)) with the variant lipolytic enzyme to produce the partial hydrolysis product, i.e. the lyso-glycolipid.

The variant glycolipid acyltransferase enzyme is useful in treating egg or egg-based products to produce lysophospholipids. The variant glycolipid acyltransferase enzyme is useful in a process for reducing the content of a phospholipid in an edible oil which comprises treating the oil with the variant lipolytic enzyme so as to hydrolyze a major part of the phospholipid, and separating an aqueous phase containing the hydrolyzed phospholipid from the oil. The variant glycolipid acyltransferase enzyme is useful in the bioconversion of polar lipids (preferably glycolipids) to make high value products, such as carbohydrate esters and/or protein esters and/or protein subunit esters and/or a hydroxy acid ester (claimed).

☐ 5. Document ID: EP 1555322 A1, WO 200183770 A2, AU 200154620 A, EP 1280919 A2, US 20030144165 A1

L3: Entry 5 of 6 File: DWPI Jul 20, 2005

DERWENT-ACC-NO: 2002-062127
DERWENT-WEEK: 200547

TITLE: Lipolytic enzyme for industrial purposes, such as a detergent additive, comprises amino acid substitutions corresponding to two hundred sixty nine amino acid sequence

INVENTOR: ROGGEN, E L

PRIORITY-DATA: 2001US-277817P (March 21, 2001), 2000DK-0000707 (April 28, 2000), 2000US-203345P (May 10, 2000), 2001DK-0000327 (February 28, 2001), 2002US-0258783 (October 28, 2002)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
EP 1555322 A1	July 20, 2005	E	000	C12N015/55
WO 200183770 A2	November 8, 2001	E	023	C12N015/55
AU 200154620 A	November 12, 2001		000	C12N015/55
EP 1280919 A2	February 5, 2003	E	000	C12N015/55
US 20030144165 A1	July 31, 2003		000	C11D001/00

INT-CL (IPC): A21 D 8/02; A21 D 8/04; C11 D 1/00; C11 D 3/386; C12 N 1/18; C12 N 9/20; C12 N 15/55; C12 N 15/74; C12 P 21/02

ABSTRACTED-PUB-NO: WO 200183770A
BASIC-ABSTRACT:

NOVELTY - A lipolytic enzyme which is a variant of a parent fungal lipolytic enzyme, comprising amino acid substitution(s) corresponding to Thermomyces lanuginosus lipase having 269 amino acid sequence, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a deoxyribonucleic acid (DNA) sequence encoding the inventive lipolytic enzyme;

(2) a vector comprising the DNA;

(3) a transformed host cell harboring the DNA or the vector;

(4) producing the lipolytic enzyme comprising cultivating the cell to express and preferably secrete the lipolytic enzyme, and recovering the lipolytic enzyme;

(5) a detergent composition comprising a surfactant and the inventive lipolytic enzyme; and

(6) preparing a dough or a baked product prepared from the dough comprising adding the inventive lipolytic enzyme to the dough and also adding end-amylase and/or a phospholipid, where the lipolytic enzyme has phospholipase and/or digalactosyl diglyceride activity.

USE - The inventive lipolytic enzyme, e.g. lipase from Thermomyces lanuginosus for industrial purposes, e.g. as detergent additive, in baking (in preparation of dough, bread, and cakes to increase dough stability and handling properties or to improve the elasticity of the bread or cake), and pulp and paper industry to remove pitch or ink from used paper. It can also be used in reducing the content of phospholipid in an edible oil, to improve the filterability of an aqueous solution or slurry of carbohydrate origin (e.g. a wheat starch hydrolysate), in processing of dairy and other food products, to release free fatty acids for flavor development in food products (e.g. in cheese ripening), and in removing fatty matter containing hydrophobic esters (e.g. triglycerides) during the finishing of textiles.

ADVANTAGE - The invention has altered properties, e.g. an increased thermostability, an altered pH dependance, or an altered substrate specificity compared to the parent enzyme. When used in a detergent, the lipolytic enzyme has an improved detergent effect, particularly an improved one-cycle wash effect. When used in baking, the lipolytic enzyme results in a softer crumb and a better elasticity from day 0-7 during storage of the baked product. Loaf volume and standing of the baked product may be improved.

☐ 6. Document ID: US 20050059130 A1, WO 200032758 A1, AU 200013763 A, BR 9915711 A, EP 1131416 A1, ZA 200102858 A, CN 1331742 A, JP 2003524386 W, NZ 511340 A, RU 2235775 C2

L3: Entry 6 of 6 File: DWPI Mar 17, 2005

DERWENT-ACC-NO: 2000-412310
DERWENT-WEEK: 200521

TITLE: Producing a lipolytic enzyme variant useful in baking processes and purification of vegetables oils, comprises altering the parent lipolytic enzyme, preparing a variant and testing its activity on selected ester bond

INVENTOR: BOJSEN, K; BORCH, K ; BUDOLFSEN, G ; FUGLSANG, K C ; GLAD, S S ; PETRI, A ; SHAMKANT, A P ; SVENDSEN, A ; VIND, J ; PETRI, A G ; FUGLSANG, C C ; PATKAR, S A ; SCHRODER, G S O

PRIORITY-DATA: 1999US-160735P (October 22, 1999), 1998DK-0001572 (November 27, 1998), 1998US-111430P (December 8, 1998), 1999DK-0000391 (March 22, 1999), 1999US-126914P (March 29, 1999), 1999DK-0001481 (October 15, 1999)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
US 20050059130 A1	March 17, 2005		000	C07H021/04
WO 200032758 A1	June 8, 2000	E	089	C12N009/20
AU 200013763 A	June 19, 2000		000	C12N009/20
BR 9915711 A	August 21, 2001		000	C12N009/20
EP 1131416 A1	September 12, 2001	E	000	C12N009/20
ZA 200102858 A	January 30, 2002		126	A21D000/00
CN 1331742 A	January 16, 2002		000	C12N009/12
JP 2003524386 W	August 19, 2003		108	C12N009/20
NZ 511340 A	July 25, 2003		000	C12N009/20
RU 2235775 C2	September 10, 2004		000	C12N009/20

INT-CL (IPC): A21 D 0/00; A21 D 8/04; A23 C 17/02; A23 L 1/105; C07 H 21/04; C11 D 3/386; C12 N 1/15; C12 N 1/19; C12 N 1/21; C12 N 5/10; C12 N 9/12; C12 N 9/20; C12 N 15/09; C12 N 15/55; C12 N 15/63; A21 D 8:04; A23 L 1:105; C11 D 3/386

ABSTRACTED-PUB-NO: WO 200032758A
BASIC-ABSTRACT:

NOVELTY - Producing (P) a lipolytic enzyme variant (V) involves selecting a substrate (S) and an ester bond (E) of interest, selecting a parent lipolytic enzyme (I), mutating the enzyme by insertion, deletion or substitution of and amino acid and preparing the variant, testing its activity on (E) and selecting the variant having an altered activity.

DETAILED DESCRIPTION - (P) involves selecting (I) comprising:

(a) an alcohol binding site having a glycerol unit with at least one amino acid residue comprising at least one atom within 10 Angstrom of the C atom at the sn2 position of a substrate triglyceride in a three-dimensional structure of (I) and (S);

(b) a catalytic triad consisting of an active Ser, Asp and His residue with at least one amino acid residue comprising at least one atom from set E comprising;

(i) the structure of the lipolytic enzyme with Rhizomucor miehei lipase structure 4TGL comprising a catalytic triad and an inhibitor phosphorus atom (4TGL-inhP), so as to minimize the sum of squares of deviation between atoms of the catalytic triads of the two structures;

(ii) defining a set A consisting of atoms of the lipolytic enzyme inside a sphere of radius 18 Angstrom with center at 4TGL-inhP;

(iii) forming a first plane defined by 4TGL-inhP, the C alpha atom of the active Ser residue of the parent lipolytic enzyme, and the C alpha atom of the active Asp residue of the parent lipolytic enzyme and defining a set B as a subset of set A consisting of atoms on the same side of the first plane as the C alpha atom of the active His residue of the parent lipolytic enzyme;

(iv) forming a second plane defined by 4TGL-inhP, the C alpha atom of the active Ser residue of the parent lipolytic enzyme, and the C alpha atom of the active His residue of the parent lipolytic enzyme and defining a set C as a subset of set A consisting of atoms on the opposite side of the second plane from the C alpha atom of the active Asp residue of the parent lipolytic enzyme;

(v) forming a set D consisting of atoms belonging to the union of sets B and C, and having a solvent accessibility of 15 or higher; and

(vi) forming set E consisting of amino acid residues in the structure which comprise an atom belonging to set D or an atom belonging to the union of sets B and C and located less than 3.5 Angstrom from an atom belonging to set D;

(c) an active site comprising an active His residue in the amino acid sequence of the parent lipolytic enzyme;

(d) one amino acid residue among 10 amino acid residues at the C-terminal; or

(e) from Humicola or Zygomycetes family and comprising an amino acid residue corresponding to residues 20-25, 56-64,81-85 and 255-269 in the Humicola lanuginosa lipase.

INDEPENDENT CLAIMS are also included for the following:

(1) (V) produced in (P);

(2) a lipolytic enzyme (Va) comprising;

(i) a substitution, deletion or insertion at a position;

(a) is a polypeptide having an amino acid sequence which has at least 80% homology with a reference lipolytic enzyme of the Humicola family or the Zygomycetes family;

(b) compared to the reference lipolytic enzyme comprises an amino acid alteration which is:corresponding to A20, Y21, G23, K24, N25, V63, R81, G82, R84, A257, W260, Y261, F262 or G266 in the Humicola lanuginosa DSM 4109 lipase;

(ii) a substitution of an amino acid corresponding to C268 or L269 in the lipase;

(iii) a substitution corresponding to V60G, D62E, L93K, L97Q, K98E,F, E99D, P256A, G263E,Q,R,F,N, L264A,C,P,F,G,V,I1265L,N,F or T267A,Q,P,S,V,E in the lipase;

(iv) an insertion corresponding to T267GS or T267GL in the lipase;

(v) a peptide extension at the C-terminal which is A,P, MD,CP, AG, DG, AGG, PVGF, AGRF, PRGF, AGGF or AGGFS;

(vi) a peptide extension at the C-terminal of 40-50 amino acids; or

(vii) a truncation of 1, 2, 3, 4, 5 or 6 amino acids at the C-terminal; and (c) has an altered activity on an ester bond in a substrate compared with the reference lipolytic enzyme;

(3) a lipolytic enzyme (Vb) comprising:

(a) a polypeptide comprising an amino acid sequence at least 80% homologous to a lysophospholipase from Aspergillus niger, the ferulic acid esterase from Aspergillus tubigensis or phospholipase A1 from Aspergillus oryzae;

(b) an amino acid substitution, deletion or insertion at position 20-25, 56-64, 81-85, 91-98, 255-257 or 259-269 in the Humicola lanuginosa lipase; and

(c) an altered activity on an ester bond in a substrate compared with the reference enzyme;

(4) a lipolytic enzyme (Vc) which is a variant of a parent lipase derived from Humicola lanuginosa strain DSM 4109 comprising the alterations E1E,D,A+ G91G,A,S,T+N94N,D+ D96D,G,F,W+ E99E,K+ G225G,R,K+ G263Q,N+ L264L,A,V+ 12651,T,S+ G266G,A,V,S,D,E+T267T,A,V+L269L,I,N,Q;

(5) a DNA sequence (II), encoding (Va), (Vb) or (Vc);

(6) a vector (III), comprising (II);

(7) a host cell comprising (II) or (III);

(8) producing (P1), (Va), (Vb) or (Vc) comprising cultivating the host cell (7); and

(9) preparing a lipolytic enzyme variant for use in baking comprising:

(a) subjecting a DNA sequence encoding a lipolytic enzyme to random mutagenesis;

(b) expressing the mutated DNA sequence obtained in step (a) in a host cell; and

(c) screening for host cells expressing a lipolytic enzyme variant which compared to the parent lipolytic enzyme has a higher:

(i) ratio selectivity for long-chain fatty acyl groups;

(ii) activity on digalactosyl diglyceride; and

(iii) phospholipase activity; and

(d) preparing the lipolytic enzyme expressed by the host cells.

USE - (Va), (Vb) and (Vc) are useful for preparing dough or a baked product,

reducing the content of phospholipid in an edible oil, improving the filterability of an aqueous solution or slurry of carbohydrate origin which contains phospholipid, as a content of detergents, enhancing the flavor of a food product preferably milk (claimed).

Terms	Documents
L1 and digalactosyl diglyceride and phospholipid and triglyceride	6

Hit List

First Hit | Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 6852346 B2

Using default format because multiple data bases are involved.

L2: Entry 1 of 2 File: USPT Feb 8, 2005

US-PAT-NO: 6852346
DOCUMENT-IDENTIFIER: US 6852346 B2

TITLE: Method for preparing flour doughs and products made from such doughs using lipase

DATE-ISSUED: February 8, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
S.o slashed.e; Jorn Borch	Mundelstrup			DK
Poulsen; Charlotte Horsmans	Bradbrand			DK
Rasmussen; Preben	Kirke Hyllinge			DK
Madrid; Susan Mampusti	V.ae butted.rl.o slashed.se			DK
Zargahi; Masoud R.	.ANG.rhus C.			DK

US-CL-CURRENT: 426/18; 426/20, 426/52, 426/549, 426/653

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw. De

☐ 2. Document ID: US 6406723 B1

L2: Entry 2 of 2 File: USPT Jun 18, 2002

US-PAT-NO: 6406723
DOCUMENT-IDENTIFIER: US 6406723 B1

TITLE: Method for preparing flour doughs and products made from such doughs using glycerol oxidase and lipase

DATE-ISSUED: June 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
S.o slashed.e; J.o slashed.rn Borch	Mundelstrup			DK
Poulsen; Charlotte Horsmans	Bradbrand			DK
Rasmussen; Preben	Kirke Hyllinge			DK

Madrid; Susan Mampusti Vaerl.o slashed.se DK
Zargahi; Masoud R. .ANG.rhus DK

US-CL-CURRENT: 426/18; 426/554

ABSTRACT:

A method of improving the rheological properties of a flour dough and the quality of bread, alimentary paste products, noodles and cakes produced therefrom, wherein a combination of (a) a glycerol oxidase which does not require a co-factor to oxidize glycerol, and (b) a lipase, is added to the dough to produce a synergistic effect upon said rheological properties; and dough improving compositions containing such components.

31 Claims, 4 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

Terms	Documents
L1 and digalactosyl diglyceride same phospholipid same triglyceride	2

Hit List

First Hit | Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Search Results - Record(s) 1 through 9 of 9 returned.

☐ 1. Document ID: US 20050281916 A1

L5: Entry 1 of 9 File: PGPB Dec 22, 2005

PGPUB-DOCUMENT-NUMBER: 20050281916
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050281916 A1

TITLE: Method of improving dough and bread quality

PUBLICATION-DATE: December 22, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Bojsen, Kirsten	Hellerup		DK
Poulsen, Charlotte Horsmans	Braband		DK
Soe, Jorn Borch	Tilst		DK

US-CL-CURRENT: 426/52; 426/496, 426/549

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw De

☐ 2. Document ID: US 20050255544 A1

L5: Entry 2 of 9 File: PGPB Nov 17, 2005

PGPUB-DOCUMENT-NUMBER: 20050255544
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050255544 A1

TITLE: Lipolytic enzyme variants and method for their production

PUBLICATION-DATE: November 17, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Svendsen, Allan	Horsholm		DK
Vind, Jesper	Vaerlose		DK
Heldt-Hansen, Hans Peter	Virum		DK
Erlandsen, Luise	Copenhagen		DK

US-CL-CURRENT: 435/69.1; 435/198, 435/254.1, 435/483

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. D

☐ 3. Document ID: US 20050196766 A1

L5: Entry 3 of 9 File: PGPB Sep 8, 2005

PGPUB-DOCUMENT-NUMBER: 20050196766
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050196766 A1

TITLE: Proteins

PUBLICATION-DATE: September 8, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Soe, Jorn Borch	Tilst		DK
Mikkelson, Jorn Dalgaard	Hvidovre		DK
de Kreij, Arno	Papendrecht		NL

US-CL-CURRENT: 435/6; 435/193, 435/320.1, 435/325, 435/69.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. D

☐ 4. Document ID: US 20050059130 A1

L5: Entry 4 of 9 File: PGPB Mar 17, 2005

PGPUB-DOCUMENT-NUMBER: 20050059130
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050059130 A1

TITLE: Lipolytic enzyme variants

PUBLICATION-DATE: March 17, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Bojsen, Kirsten	Hellerup		DK
Svendsen, Allan	Horsholm		DK
Fuglsang, Claus Crone	Niva		DK
Patkar, Shamkant Anant	Lyngby		DK
Borch, Kim	Birkerod		DK
Vind, Jesper	Lyngby		DK
Petri, Andreas	Copenhagen		DK
Schroder Glad, Sanne O.	Ballerup		DK
Budolfsen, Gitte	Frederiksberg		DK

US-CL-CURRENT: 435/198; 435/252.31, 435/320.1, 435/69.1, 510/320, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 5. Document ID: US 20040170736 A1

L5: Entry 5 of 9 File: PGPB Sep 2, 2004

PGPUB-DOCUMENT-NUMBER: 20040170736
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040170736 A1

TITLE: Production of starchy food products

PUBLICATION-DATE: September 2, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Ross, Andrew	Corvallis	OR	US
Spendler, Tina	Malev		DK
Christiansen, Luise	Copenhagen V		DK

US-CL-CURRENT: 426/549; 426/637

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 6. Document ID: US 20040071853 A1

L5: Entry 6 of 9 File: PGPB Apr 15, 2004

PGPUB-DOCUMENT-NUMBER: 20040071853
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040071853 A1

TITLE: Method for preparing flour doughs and products made from such doughs using glycerol oxidase

PUBLICATION-DATE: April 15, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Soe, Jorn Borch	Mundelstrup		DK
Poulsen, Charlotte Horsmans	Bradbrand		DK
Rasmussen, Preben	Kirke Hyllinge		DK
Madrid, Susan Mampusti	Vedboek		DK
Zargahi, Masoud R.	Arhus C.		DK

US-CL-CURRENT: 426/549

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 7. Document ID: US 20030175383 A1

L5: Entry 7 of 9 File: PGPB Sep 18, 2003

PGPUB-DOCUMENT-NUMBER: 20030175383
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030175383 A1

TITLE: Method of improving dough and bread quality

PUBLICATION-DATE: September 18, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Bojsen, Kirsten	Hellerup		DK
Poulsen, Charlotte Horsmans	Braband		DK
Soe, Jorn Borch	Tilst		DK

US-CL-CURRENT: 426/20

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw De

☐ 8. Document ID: US 20030144165 A1

L5: Entry 8 of 9 File: PGPB Jul 31, 2003

PGPUB-DOCUMENT-NUMBER: 20030144165
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030144165 A1

TITLE: Lipolytic enzyme variant

PUBLICATION-DATE: July 31, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Roggen, Erwin Ludo	Lyngby		DK

US-CL-CURRENT: 510/226; 426/20, 435/198, 435/254.2, 435/320.1, 435/69.1, 510/320

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw De

☐ 9. Document ID: US 20030108641 A1

L5: Entry 9 of 9 File: PGPB Jun 12, 2003

PGPUB-DOCUMENT-NUMBER: 20030108641
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030108641 A1

TITLE: Method for preparing flour doughs and products made from such doughs using glycerol oxidase

PUBLICATION-DATE: June 12, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Soe, Jorn Borch	Mundelstrup		DK
Poulsen, Charlotte Horsmans	Bradbrand		DK
Rasmussen, Preben	Kirke Hyllinge		DK
Madrid, Susan Mampusti	Vedboek		DK
Zargahi, Masoud R.	Arhus C.		DK

US-CL-CURRENT: 426/18

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

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Terms	Documents
L4 and digalactosyl diglyceride and phospholipid and triglyceride	9

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DATE: Thursday, March 09, 2006

Hide?	Set Name	Query	Hit Count
	DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=ADJ		
☐	L2	(lipase or phospholipase or lipolytic enzyme) and SP792	0
☐	L1	(lipase or phosphlipase or lipolytic enzyme) and SP792	0

END OF SEARCH HISTORY